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WORKFORCE STATISTICS: DO WE KNOW WHAT WE THINK WE KNOW --AND WHAT SHOULD WE KNOW?

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by

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December 26, 1989

Printed for the use of the Joint Economic Committee

J842-19

This paper benefited greatly from the unstinting help supplied by Bureau of Labor Statistics and Census Bureau staff members. They provided wise counsel an technical help, but in line with established practice, their names are not listed. In addition, we are indebted to Professors Arvil Van Adams (The George Washington University), Daniel Hamermesh (Michigan State University) and Andrew Sum (Northeastern University) for their helpful, critical and valuable comments.

This study was prepared under an ongoing grant from the Ford Foundation to the Center for Social Policy Studies of the George Washington University. In line with the Foundation's practice, responsibility for the contents of this paper was left with the center director.

LETTER OF TRANSMITTAL

December 26, 1989

To the Members of the Joint Economic Committee:

A decade ago, Professor Sar Levitan, of the George Washington University, chaired the National Commission on Employment and Unemployment Statistics. The Commission's conclusions of that time have been repeatedly reaffirmed by those concerned about our Nation's statistical system: In a changing economy, statistical policy must look ahead, attempt to anticipate change, and provide for it. In this paper, Professors Levitan and Frank Gallo document our failure to do so.

Private businesses, governments at all levels and everyday citizens venture enormous sums of money on the presumption that Federal economic statistics are accurate:

- Firms' investment decisions depend crucially on government assessments of economic trends, themselves based on labor force data from the Bureau of Labor Statistics (BLS) and the Census Bureau. These same data are used to guide economic development policies of all levels of government.

- Wage contracts frequently are indexed to government price data, as are social security payments.

- Other government agencies' statistical estimates, like GNP and industrial production, rely importantly on BLS and Census source data.

- Fiscal and monetary policies attempt to guide the economy based on a statistical assessment of current conditions.

- And of course, the citizens themselves need accurate information about the Nation's economy to order their own finances and to make sound judgements about their leaders' stewardship.

By contrast, the budget savings that can be achieved by squeezing Federal statistical programs are minuscule. Estimated *total* 1989 funding for the major BLS and Census labor force surveys was $143 million, only one about one hundredth of one percent of total Federal outlays. Clearly, these statistics' impact on business, government and household decisions is vastly larger than their implications for the Federal budget.

In the last decade, however, statistical agencies' budgets have been constrained. This has hindered their attempts to keep up with the rapid pace of change and also required the curtailment of useful, existing efforts. Some statistical series have been discontinued while others have had their precision or scope reduced. By and large, the Bureau of Labor Statistics and the Census Bureau, which oversee our labor force statistics, have attempted to maintain their core responsibilities, while short-changing the investment necessary to keep abreast of our changing society.

Constraining these agencies' budgets has proven penny-wise and pound-foolish. Users of government statistics have become increasingly aware of their inadequate state and continuing deterioration. While the professional community and concerned observers like the Joint Economic Committee have long recognized the slippage of Federal statistical quality, the problems are becoming more evident.

As an example, large upward revisions of estimated employment growth last summer changed businesses' and policymakers' assessments of economic conditions from weakness to strength. The revisions were followed by prominent articles in the *Wall Street Journal* and the *New York Times*, as well as an editorial in *Business Week*, complaining about statistical deterioration. In the most recent employment release, estimated payroll growth was again revised substantially, this time downward.

The Council of Economic Advisers recently has embraced the cause of improved statistical infrastructure as well. They will soon release the report of an inter-agency working group on the most urgent and easily addressed statistical needs. Though this effort is welcome after years of cutbacks, it does not go far enough. The erosion of our statistical base has proceeded for so long that patching up these programs merely postpones addressing more serious and fundamental problems.

Professors Levitan and Gallo provide a detailed and broad ranging analysis of the strengths and shortcomings of our statistical system. I commend this paper to the consideration of the Congress and the public.

With best regards,

Sincerely,

Lee H. Hamilton, *Chairman*

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EXECUTIVE SUMMARY

A decade has elapsed since the Congressionally mandated National Commission on Employment and Unemployment Statistics presented to Congress and the President a review of the Nation's labor force statistical system. The need for a successor is clear. Changing economic and social conditions challenge existing resources and methods, while computer advances present promising new opportunities.

Like similar commissions in the past, a broadly representative, expert commission, jointly appointed by the Congress and the President, could help to formulate a consensus on statistical needs and priorities. In cooperation with the Bureau of Labor Statistics, the Census Bureau, and other experts, such a commission also could help design an agenda for the years ahead.

Concerns about labor force statistics revolve around several major issues:

Do we accurately measure the size of the labor force? Though the Census Bureau has significantly reduced the number of people missed in the decennial census, urban, Black and Hispanic populations still are poorly measured. Illegal immigration, homelessness and the deterioration of low-income neighborhoods make undercounts an enduring problem.

Do monthly employment estimates accurately describe current business conditions? The accuracy and usefulness of the monthly employment data should be strengthened, since it is our most timely indicator of economic conditions.

Has economic change left our productivity estimates behind? The growth of the services sector, whose output is extremely difficult to gauge, suggests that overall productivity measures have become less reliable.

Do we really know how well employees are remunerated? Non-wage benefits, which frequently are difficult to value, now account for more than a fourth of employer labor costs. The increasing importance of benefits has complicated the measurement of compensation and muddied the debate about trends in living standards. Furthermore, nonresponse rates to annual earnings questions have risen to 28 percent for the important Current Population Survey, raising doubts about its reliability.

How can we describe occupations more accurately and consistently? The most commonly used occupational survey seems to overestimate job mobility, and survey results often differ greatly even when occupations ostensibly are defined in the same way.

Do we accurately measure educational attainment? Standard measures of attainment have less relationship to ability due to the proliferation of diplomas and degrees of doubtful value. Current data provide only limited insight into the links between education and work. Assessing the competence of our workforce is essential because of its impact on productivity and our place in the world.

Do we need better data on the nature and extent of poverty? The poverty rate remains at a disturbingly high level considering the seven-year economic expansion. We need better information about the interactions among poverty, low wages, inadequate employment opportunities and the erosion of family structure.

Are we accurately tracking the changing nature of employment? Businesses have hired a growing number of "contingent" workers, who receive less pay and fewer benefits than full-time, permanent workers. We have little information on how many workers choose such jobs because they seek intermittent work and how many feel that they have no other options. Widespread contingent employment might increase pressure for government provided health care or other services, and it might also affect our assessment of the Nation's economic well-being.

Some improvements in labor force statistics can be achieved through better use of existing resources, with only minor additional expenditures.

- More intensive analysis of the Survey of Income and Program Participation (SIPP) and the March supplement to the Current Population Survey (CPS) could yield a better understanding of the relationship between work-related problems and economic hardship.

- Redesign of the CPS could improve information about changes in individuals' status over time. Timely processing of SIPP would enhance the usefulness of this survey for the same purpose.

- More precise CPS questions could improve estimates of the number of hours worked and yield more meaningful earnings data.

- The consolidation of occupational classification systems and minor alterations in data collection could improve the quality of occupational information.

- More intensive use of administrative records--with adequate protection of confidentiality--would greatly enrich our understanding of how individuals' work behavior changes over time.

- Divergences between the major surveys that track employment, hours and pay deserve close scrutiny.

The kind of sustained effort that would lay an enduring foundation for our economic statistics, however, will require more resources.

- Doubling the CPS' sample size would make up for its reduction in the early 1980s and permit State and local governments, as well as private firms, to base their decisions on more accurate sub-national information.

- Low unemployment rates and high crime rates in some surveyed areas have boosted the pay required to hire and retain qualified survey enumerators.

- Additional and sustained funding would enable the major longitudinal surveys to track more accurately the changing economic, educational, occupational and family status of individuals over time.

- The increasing importance of international trade underlines the need for reliable international comparisons of workers' productivity, skills and compensation.

Though the precise challenges facing those who collect our labor force statistics have changed somewhat during the last decade, the basic conclusion of the National Commission on Employment and Unemployment Statistics has not:

> "The Nation is served by a comprehensive labor force data system expertly prepared by a cadre of dedicated public servants. But if the statistics are to reflect changing economic conditions and meet policy needs, periodic revisions and improvements are necessary."

Having neglected to invest in statistical infrastructure since that conclusion was reached, it is imperative that the necessary resources be allocated to shore up the Federal labor force statistical reporting system. The cost of providing citizens, businesses, and government at all levels with reliable information about economic conditions is relatively small. The cost of not having timely, accurate and useful information is not.

THE FOUNDATION

On the first Friday of each month, the Commissioner of the Federal Bureau of Labor Statistics marches up Capitol Hill to reveal the latest unemployment rate and other key labor force indicators. The announcement is more closely watched and has greater impact than the oracles of old. Labor force data play a critical role in government decisions over whether to stimulate or restrain the economy. Every percentage point rise in the unemployment rate may boost the annual Federal deficit by as much as $44 billion. Private business decisions--whether to build up or contract inventory, and to hire new workers or lay off current employees--weigh the monthly labor force count. Government and business actions will in turn affect consumer decisions over whether to purchase a home, buy a car or invest in a nest egg.

Given the role labor force statistics play as a barometer of the Nation's economic health and in guiding economic decisions, the need for reliable and relevant statistics is apparent. The system should be flexible enough to meet day-today as well as long-term needs. School guidance counselors need sound information to advise students deciding upon a career, and businesses often consider the quality of the local labor force in determining where to locate or expand their operations. Most importantly, measurement tools and methods should keep pace with the constantly changing economy or face obsolescence.

Labor force statistics must fulfill the needs of diverse users, but some issues deserve priority. The problems of unemployment and poverty command the Nation's attention. Other critical issues include a better understanding of sluggish wage and productivity growth since 1973, the disturbing skill deficiencies of many workers, the drastic changes in family structure and their impact on labor market activities, and the challenges presented by a growing aged population. Quality statistics are necessary not only to understand the causes and consequences of labor market malfunctions, but also to ameliorate labor market related economic hardship and promote more equitable, efficient operations.

Council of Economic Advisors Chairman Michael Boskin has noted, "The quality of statistics as a whole is a serious problem."[1] The 1960s and 1970s witnessed major advances in labor force statistics, but budget cuts in the 1980s forced the U.S. Bureau of Labor Statistics and the Census Bureau to concentrate on preserving their core responsibilities, sometimes at the expense of innovation. More research is necessary to address the poor quality of educational statistics and to track individual behavior over time. Some current surveys require either replacement or enhanced financial backing. Advances in computer technology have opened up important opportunities for gaining better insights into the experience of individuals during their working career and beyond, but these remain largely untapped.

The Nation's labor force statistics system needs guidance as well as money. In the past, national commissions periodically have helped focus attention on quality and establish long-range goals. Thirteen years have elapsed since Congress mandated the last commission, and the statistical agencies could not implement its most important recommendations because of budgetary constraints. Another

commission is needed to reassess the quality of labor force statistics, and to set priorities among major workforce-related emerging research issues.

DECENNIAL CENSUS

The Constitution mandates a decennial population count to determine the distribution of representatives among the states. The 1820 decennial census first reported a nationwide employment count, and the census remained the major source of workforce information for another century. Sample surveys have largely displaced the preeminent role of the decennial census, but it continues to influence the quality of sample surveys. Because the census is the only attempt to count the entire population, other surveys use it as a base from which to select random, stratified samples.

Undercounting continues to be a principal weakness of the census, although Census Bureau procedures have lowered the estimated net undercount from 5.6 percent of the population in 1940 to 1.4 percent in 1980 (over 3 million people). There remains, however, a substantial difference in the undercounting of blacks and whites (5.9 versus 0.7 percent).[2] The number of immigrants residing illegally in the United States and homeless persons is virtually impossible to estimate reliably. These undercounts are reflected in all surveys based on the decennial census, particularly affecting data on the low income population where the undercount is most pronounced. Recent developments are likely to reduce the undercount problem. The 1990 census will, for the first time, attempt to count the homeless, although the Census Bureau announced in advance that a complete tally will not be achieved. Following the 1986 Immigration Reform and Control Act, several million formerly illegal aliens will have no reason to evade the 1990 census enumerators. However, the one-time amnesty will, of course, not shed any light on the number of aliens not covered by the 1986 law and those who enter the U.S. in the future.

Cities and states which belleve that they are being short-changed in the allocation of federal funds and congressional representatives have filed lawsuits to require the Census Bureau to adjust the decennial data for the undercount. In mid-1989, the Bureau agreed to consider an adjustment as part of a complicated legal settlement with several states, localities, and civil rights groups.[3]

CURRENT POPULATION SURVEY (HOUSEHOLD SURVEY)

The lack of reliable data to regularly gauge unemployment during the Great Depression, and advances in sampling techniques, led to the inauguration of a monthly survey of unemployment in 1940. The survey, renamed the Current Population Survey (CPS) after World War II, evolved into the single most important source for assessing national economic and social conditions. CPS data are collected by the Census Bureau, which forwards workforce-related information to the U.S. Department of Labor's Bureau of Labor Statistics (BLS) for analysis and publication. Unlike the decennial census, the CPS excludes military personnel, residents of institutions and the homeless. The Defense Department supplies the

monthly number of stateside military personnel, but CPS does not collect information on their activities. The size of the sample expanded during its first four decades, but has been cut during the 1980s:

Year	Household Sample Size
1950	22,000
1960	35,000
1967	50,000
1978	55,000
1980	65,000
1981	71,000
1982	60,200
1989	55,800
1990 (proposed)	59,000

The primary purpose of the regular monthly survey has remained the assessment of work-related behavior, including labor force status, earnings, type of industry and occupation, hours worked, reasons for not working, past work history and future work intentions if not working, and union status, along with various demographic characteristics. To enhance cooperation and maximize quality, the basic questionnaire is designed to take about 10 minutes to complete. Households are interviewed monthly for four consecutive months, leave the sample for the next eight months, and are then interviewed for another four months. This procedure reduces survey costs, and also permits some longitudinal comparisons over the 16-month period. CPS does not follow movers, but instead interviews residents at a specified address. For example, if the White House were part of the 1988-9 sample, interviewers would have queried President Bush in February 1989 rather than former President Reagan, who moved from that address in January.

Supplementary survey questions augment the knowledge derived from the monthly CPS. Regular annual surveys question participants about sources of income, work experiences, current educational enrollment and attainment, health insurance, geographical mobility, and--for women--fertility history and anticipated births. Other supplements, conducted less frequently, assess work history, multiple jobholding, work schedule, worker displacement, child care arrangements, child support and alimony, and marital history, among other subjects. Several new surveys which may become regular supplements to the CPS collect data on pension, unemployment insurance and health care coverage as well as immigration and emigration.

The relatively large sample size and diverse inquiries of the CPS render it immensely useful for measuring workforce behavior and the interaction between work and family status, poverty, education, and health. But no single survey can meet all of the nation's needs and insatiable curiosity. CPS sample size is adequate to produce monthly national and state estimates for the 10 states with the largest populations and New York City and Los Angeles, but only annual estimates for the balance of states and larger localities.

CURRENT EMPLOYMENT STATISTICS (ESTABLISHMENT SURVEY)

The Current Employment Statistics (CES) program surveys business establishments. It defines an establishment as "an economic unit which produces goods or services, such as a factory, mine, or store. It is generally at a single location and engaged predominantly in one type of activity."[4] A firm, of course, may comprise two or more establishments.

The establishment survey is a cooperative federal/state effort. It dates back to 1915, but not until 1939 was it extensive enough to produce national employment estimates. The present survey samples some 330,000 establishments employing over 44 million workers, and achieves a response rate of 89 percent. Employers report the number of employees (total, women, and production or nonsupervisory workers), and the payroll and paid hours of production or nonsupervisory workers. Manufacturing establishments also report overtime hours. The CES gathers only the information readily available from payroll records, which precludes determining, for example, the earnings of men compared to women. Unlike the CPS, the CES sample retains many establishments in perpetuity (particularly larger ones), but since most firms routinely record the requested information for their own purposes, the reporting burden is minimal. BLS estimates that establishments spend an average of about seven minutes per month preparing the reports.[5]

The CES has some advantages over the CPS. A larger sample size permits more detailed disaggregation of employment, hours and wages by industry. During the 1980s, BLS has increased the number of sampled establishments by about two-thirds, thereby increasing the reliability of the results. CES use of existing records obviates memory problems which afflict surveys of individuals. The two surveys complement each other in that each provides a check on the other's accuracy, although definitional and coverage differences necessitate some adjustments. CES data do not include self-employed, farm and unpaid family workers, but count separately each job moonlighters hold.

SURVEY OF INCOME AND PROGRAM PARTICIPATION

The Survey of Income and Program Participation (SIPP), designed to obtain extensive information on income and participation in government programs, is the newest major government survey. Following several years of trial runs, the Census Bureau inaugurated SIPP in late 1983 with a sample of 20,000 households, later reduced because of budget cuts to 11,600. Households remain in the survey for about 2.5 years and are interviewed every four months. The bureau introduces a new sample every year. Therefore, at a given time, either two or three sample panels are surveyed concurrently, totaling either 23,200 or 34,800 households. President Bush proposed in his 1990 budget to resume a 20,000 household sample, but the House of Representatives rejected the request.

SIPP is potentially capable of providing more comprehensive insights into the interaction of work and other activities than CPS, including information on health, family structure and income sources. CPS collects similar information in a

supplementary survey only once a year in March (covering the previous calendar year), making the survey dependent on a longer period of recall than SIPP's four months. The annual CPS supplements also assume that the same household resided at the address throughout the year, whereas SIPP can closely track the interaction between family change and economic circumstances. Each SIPP interview lasts about 40 minutes per household, which, of course, enables the collection of much more information than CPS. SIPP's 2.5 year cycle also enables analysts to track short-term changes in household structure and individual behavior.

The CPS retains advantages over SIPP, however. Its much larger sample size permits more reliable national, state and local estimates, and a closer look at work behavior by detailed demographic characteristic. BLS reports monthly data three weeks after the interviews, while the latest published SIPP report, as of October 1989, was based on interviews conducted more than three years earlier. The annual CPS income data are also available long in advance of the SIPP data. The difficulties of implementing a complex new survey with sparse staff have impaired SIPP's timeliness.

Moreover, the Census Bureau had difficulty deciding which survey findings to publish. The bureau initially published limited information on income and program recipiency, but then replaced this with reports on the SIPP supplements which cover a wide variety of topics, including wealth, child care, pension coverage, and gender earnings disparities. Future publications will cover both income and program recipiency and the special supplements, as well as longitudinal information derived from the survey.

Finally, although SIPP income data are less subject to memory constraints than information from CPS, the reverse is true for employment data. The CPS questions respondents each month, and concentrates on their labor force activities in the preceding week. SIPP queries respondents every four months about their weekly experience during the entire period. The resulting data are, therefore, not necessarily comparable, although the findings are often similar.

UNEMPLOYMENT INSURANCE RECORDS (ES 202 PROGRAM)

The unemployment insurance administrative records cover 97 percent of total employees and their wages and constitute a valuable source of workforce information. Almost all establishment-based labor force surveys use the UI data to select their samples, in the same manner that household surveys rely upon the decennial census. UI records are updated continually and are therefore more timely and versatile than the decennial census, and can potentially be used to track individuals and establishments over time. The data also provide geographical detail not possible from sample surveys. BLS has instituted improvements in the program since it assumed oversight responsibility, but the untapped potential of UI data for labor market analysis remains considerable.

THE LONGITUDINAL PERSPECTIVE

Most surveys present a snapshot of the labor force at a specific point in time. The importance of a longitudinal perspective for better understanding the labor market and for policy formulation is obvious. For example, CPS results may indicate an equal number of unemployed during two consecutive months. However, the published data do not reveal how many individuals were out of work in both months. Such data are critical for understanding and ameliorating unemployment.

SIPP, the five national longitudinal surveys of labor market behavior (NLS), and the panel study of income dynamics (PSID) are currently the major sources for longitudinal labor market analyses. NLS and PSID are funded primarily through BLS and the National Science Foundation and are administered by Ohio State University and the University of Michigan, respectively. The longitudinal surveys sponsored by the federal Education Department collect less labor market information but provide data critical to understanding basic skills and the transition from school to work. The sample size of the surveys which supply longitudinal information varies from 5,000 to nearly 60,000 households, the length of time the individual or household is followed varies from 16 months to over two decades, and the frequency of interviews varies from monthly to only once every few years (see Table 1).

Longitudinal surveys have provided insights otherwise unavailable about work and other activities that may affect it. However, an inherent shortcoming of longitudinal surveys is the difficulty of ensuring that the sample continues to be representative of the population. Other problems faced by longitudinal surveys are their vulnerability to funding fluctuations, reinterview bias, and the compound impact of errors. Attrition rates can mount rapidly when respondents move or cannot be located, refuse to be reinterviewed, or die. Even if attrition were not a problem, repeated interviews may alter respondents' answers and possibly their behavior. For example, two percent of SIPP respondents learned of government programs from the survey itself and then applied for benefits.[6]

The government has taken only tentative steps in creating longitudinal surveys of establishments. The sole existing survey, the longitudinal establishment data file, includes only manufacturing establishments, and it may not adequately measure change because the data are collected only annually.[7]

FUNDING

The federal government's statistical operations cost about $1.5 billion annually apart from the 1990 census, which will carry an estimated $2.6 billion price tag over a 10-year period. The estimated fiscal 1989 budget for BLS was $190 million.[8] Due to the variety of agencies which produce workforce-related statistics, and the dependence of BLS operations on other sources such as the decennial census and administrative records, estimates of the total cost of labor force information would be guesses at best.

TABLE 1. MAJOR LONGITUDINAL SURVEYS

Survey	Sample Size	Year of First Survey	Time in Survey	Time Between Interviews	Approximate Attrition Rate
Entire Population					
SIPP	11,600 households	1983	2.5 years	4 months	20%
CPS	55,800 households	1953	16 months	either 1 or 8 months	not applicable
Panel study of income dynamics	4800 families	1968	indefinite	1 year	40% for reasons other than death
Targeted Groups					
National longitudinal surveys of labor market behavior (4 separate surveys)	5,000 individuals in each sample	1966-1968	indefinite except for two discontinued surveys	1 or 2 years	25-31% for reasons other than death
National longitudinal survey of youth	13,000	1979	indefinite	1 year	4%
High school and beyond	58,000 high school sophomore and seniors	1980	indefinite	2 years	10%
National longitudinal survey of the high school class of 1972	23,000 high school seniors	1972	indefinite	has varied from 1 to 7 years	20%
Establishments					
Longitudinal establishment data file	about 75,000 manufacturing establishments	1972	indefinite	1 year	not reported

SOURCES: Statistical Policy Office, *Federal Longitudinal Surveys* (Washington: U.S. Office of Management and Budget, May 1986), pp. 67-146; Robert Boruch and Robert Pearson, "Assessing the Quality of Longitudinal Surveys," *Evaluation Review*, February 1988, pp. 3-58.

Estimated 1989 funding for the major BLS and Census Bureau labor force surveys totaled $143.3 million, as follows:

Survey	Cost (millions)
Current population survey	$27.6
Current employment statistics	26.8
Survey of income and program participation	20.0
Unemployment insurance (ES 202)	19.4
Local area unemployment statistics	13.3
Occupational employment statistics	8.0
National longitudinal surveys of labor market behavior	6.2
Professional, administrative, technical, and clerical pay survey	5.8
Employment cost index	5.5
Permanent mass layoffs and plant closings survey	4.6
Area wage surveys	3.9
Industry wage surveys	2.2

BLS financing for labor force statistics (excluding surveys transferred to BLS from other agencies) has fluctuated during the 1980s (see Table 2). Conclusions about how funding levels have changed are dependent upon the method of adjusting for inflation. According to an index constructed from BLS cost estimates of maintaining identical services in succeeding years (which rose nearly 80 percent over 1980-1988), funding levels remained below 1980 for the entire decade. If the GNP deflator (which increased 40 percent over 1980-1988) is used to adjust for inflation, BLS funding exceeded the 1980 level from 1987 on.

The Reagan Administration proposed and Congress acquiesced to significant funding retrenchments in the early 1980s, which obliged BLS to make program cuts. Most important was the reduction of the CPS sample by a fifth since 1981, to under 56,000 households (an increase to 59,000 is scheduled for fiscal 1990). In 1981, Labor Department Secretary Raymond Donovan rejected the recommendations of the National Commission on Employment and Unemployment Statistics which involved additional outlays, without consideration of their merit.[9] BLS terminated surveys or projects pertaining to estimated family budgets, manufacturing job turnover rates, and a variety of collective bargaining issues. The agency also had to abandon or postpone efforts to test the wording of survey questions, improve the collection of establishment-based and state and local employment statistics, and obtain data on job vacancies.[10]

Cuts elsewhere in the Labor Department and other agencies in the early 1980s further curtailed the collection, analysis and dissemination of important labor force information. The Department's Employment and Training Administration cut drastically its research activities; scaled back the collection and reporting of information from the national longitudinal surveys of labor market behavior,

TABLE 2. FUNDING OF BLS LABOR FORCE STATISTICS DURING THE 1980'S, EXCLUDING TRANSFERS FROM OTHER AGENCIES AND ONE-TIME PROGRAM REVISIONS (Millions of dollars)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Current Dollars	57.5	59.5	58.6	62.1	64.3	73.0	70.9	85.0	82.5	95.4
Alternative Inflation Adjustments (1988 dollars)										
a. BLS current services budget	96.3	93.4	82.1	82.4	82.3	89.3	81.7	92.1	82.5	90.5
b. GNP federal nondefense purchases	80.5	75.4	69.8	71.2	71.3	78.3	74.5	87.4	82.5	n.a.

SOURCES: Derived from Office of Management and Budget, *Budget of the U.S. Government, Appendix,* Fiscal 1982 to 1990, and unpublished BLS data.

NOTE: Labor force statistics include the following BLS budget categories: labor force statistics, wages and industrial relations, productivity and technology, and economic growth and employment projections.

unemployment insurance, employment service and job training programs and cancelled a longitudinal study based on unemployment insurance records after eight years of operation. The Office of Management and Budget attempted to block SIPP, delaying its implementation for two years, and postponed the revision of the standard industrial classification code for six years. The Department of Health and Human Services ended collection of health care occupational data. Cuts affecting the Internal Revenue Service, Social Security Administration and Immigration and Naturalization Service dampened the willingness of these agencies to participate in statistical activities not directly pertinent to their prime operational responsibilities.[11]

During the 1980s, BLS and Census have preserved the major surveys necessary to analyze the labor force. However, as BLS Commissioner Janet L. Norwood noted, "A statistical agency cannot stand still; it must move forward or it will fall backward."[12] Former Chief Economist of the Commerce Department, Courtenay Slater, has reinforced this view. "The most serious damage that has been done to our statistical system during the past few years," she observed, "is not the loss of any specific data set, but the weakening of the capacity to modernize, to innovate, to anticipate changing data needs, to keep up with the times."[13]

THE BUILDING BLOCKS

The major elements of the labor force reporting system include labor force status, time at work, compensation, industry and occupation, education and training, productivity, and forecasting. Every census, survey and administrative record measuring work-related behavior uses at least one of these components. The challenge for the designers of the labor force surveys is to establish uniform, stable concepts and definitions, lest diverse data sources produce a Babel of tongues. Societal changes constantly threaten consistency and continuity. For example, when the decennial census first started to count the number of employed persons in a predominantly agrarian economy, it appropriately included 10-year-old children, a definition unthinkable today.

COUNTING HEADS

The concepts we use to define the labor force are barely a half century old. Before 1940, the Census Bureau recorded individuals who reported an occupation as gainful workers, even if they were unemployed or retired. Currently, employment, unemployment, and being out of the labor force are defined as mutually exclusive categories.

Since 1880, every decennial census except that of 1920 queried respondents about their unemployment. When President Harding called a special conference on unemployment during the 1920-21 recession, the only means participants possessed to answer his question about the extent of joblessness was to take an average of their collective guesses.[14] During the early years of the Great Depression, estimates of unemployment provided by business and labor groups differed by as much as 100 percent.

BLS currently defines employment in the CPS as work for pay or profit, even for only an hour during the survey week, or 15 or more hours of unpaid labor in a family business. Persons temporarily absent from work due to vacation, illness, strikes or bad weather are considered employed. This definition of employment excludes homemakers and volunteers, primarily for reasons of conceptual clarity, although their activities may be indistinguishable from those of paid workers in similar occupations. Absent remuneration, it would be difficult to distinguish work from most aspects of daily living. Persons not working but available to do so during the survey week are counted as unemployed, if they have sought work during the preceding four weeks, are waiting to be recalled from layoff, or are due to begin a new job within 30 days. All other individuals age 16 and over are categorized as out of the labor force. The homeless, institutionalized persons, and overseas military personnel (over 4 million people) are not included in the CPS, although U.S.-based military personnel are added to the employment count at the national level only.

The household and the establishment surveys are the major sources for estimating employment. Even after adjustment for definitional and coverage differences, the gap between the two surveys has fluctuated significantly since 1984. The fluctuations may be due to changes in moonlighting practices (the CPS counts persons while the CES counts jobs), undercounts of undocumented aliens, or

unknown survey flaws. To date, no single explanation appears convincing.[15] More frequent examinations of multiple jobholding than the four-year gap between the May 1985 and May 1989 surveys would shed additional light on differing CPS/CES employment counts. Until 1981, the supplement was conducted annually.

CPS classifies employment into wage and salaried employees, the self-employed, and unpaid workers in family enterprises. Economic changes are blurring the distinction between the first two categories at both the lower and higher status ends of the workforce. To avoid payroll taxes and benefit costs, growing numbers of employers reportedly contract with individuals (who are therefore technically self-employed) rather than hiring them as employees. Alternatively, many self-employed professionals such as physicians and lawyers have incorporated their businesses for tax reasons, and therefore technically become employees of their own corporations. Current surveys measure these two developments very poorly or not at all.

BLS currently reports seven different unemployment rates, ranging in the third quarter of 1989 from 1.1 percent (those unemployed 15 weeks or more) to 7.9 percent (including discouraged workers and half of part-timers who want full-time work). The "official" rate, based on the concepts discussed earlier, was 5.2 percent.

BLS estimates labor force statistics for most states and virtually all localities by combining information from CPS, CES and unemployment insurance data. The agency has made many technical improvements over time in estimating local labor force statistics, but local unemployment rates (which BLS is obliged to estimate in response to legislation) present continuing challenges. To improve unemployment estimates, BLS has proposed--funds permitting--to increase the CPS sample to over 100,000 households by the mid 1990s. For the most part, the additional households would be interviewed a week after the current sample, and the supplemental sample would only be used to produce state and some local estimates.[16]

In addition to the broad labor force surveys, Congress directed the Labor Department to collect data on plant layoffs and closings. Initiated in 1984, the permanent mass layoffs and plant closings survey has gotten underway slowly because of funding limitations and difficulties in securing cooperation from state employment security agencies. By 1989, all states but California had agreed to participate in the survey, although some others had not yet provided data.

An ongoing survey of job openings could shed light on the availability of jobs for the structurally unemployed and provide a timely warning of economic downturns. However, a job vacancy survey entails considerable costs and difficulties in obtaining reliable data. A 1981 BLS report on a pilot survey noted these drawbacks: 1) medium size establishments often don't possess complete information on openings; 2) the survey could not incorporate new establishments (which are highly likely to have openings) into the sample in a timely fashion; and 3) the estimated 1981 annual cost of $25-30 million would make it more expensive than the CPS.[17] As an alternative, periodic investigations of hiring practices might prove more appropriate than an ongoing survey.

PUNCHING THE CLOCK

An accurate indicator of working hours is essential to assessing labor supply, living standards and productivity. The length of the work week would appear a straightforward concept, but its measurement is problematic. Three separate surveys gauge time at work. The CES collects information from private nonagricultural establishments on the paid hours per job for production or nonsupervisory workers (depending upon the industry). A separate survey of over 5000 establishments is designed to assess differences between hours worked and hours paid, an important factor in calculating worker productivity. Finally, the CPS measures hours worked per worker. In contrast to earlier experience, CPS and CES reports of hours worked have diverged since 1978.[18]

	CES	CPS (nonagricultural workers)
1950	39.8 hours	40.7 hours
1978	35.8	38.7
1988	34.7	39.3

The measurement of work time may, if anything, be growing more imprecise. Use of timecards is less common in the growing white collar sector, where employer records of time worked are probably based on scheduled hours.

BRINGING HOME THE BACON

Compensation from work, which constitutes the lion's share of personal income, is the single most important indicator of living standards. The Census Bureau and Bureau of Labor Statistics began collecting data on earnings in the 1880s, and the 1940 census marked the initial effort to ascertain the earnings of all workers.

Because users of the data have widely divergent interests and needs, several surveys provide primary information on compensation (see Table 3). Measuring compensation entails decisions over what to count (regular pay, bonuses, overtime or benefits); who is covered; when to count compensation (hourly, weekly, monthly or annually); and how to adjust for cost of living changes.

Because of definitional and coverage differences, the results from various surveys are not necessarily comparable. The discrepancy between weekly and annual earnings reported by CPS and the unemployment insurance program is especially puzzling. Because the UI program counts each job as if it were a separate worker, it should indicate lower average earnings than the CPS. Data from Internal Revenue Service W-2 forms, which slightly understate wages, indicate that CPS results are probably more accurate than the UI data.[19]

Source	Mean Wages	
	Weekly	Annual
Unemployment insurance	$401	$20,855
Current Population Survey (wages and salaries only)	367	18,236
Social Security Administration (W-2 forms)	NA	17,546

CPS and SIPP are the prime information sources for self-employment earnings. CPS reports individuals' net business profit or loss, while SIPP asks respondents how much money they take out of their business. The two methodologies yield different results, and each possesses advantages and disadvantages. CPS results are probably too influenced by the reports individuals provide to the IRS, and thus underestimate earnings. SIPP, by definition, excludes business losses, and other evidence indicates that it, too, underreports self-employment earnings.[20]

Measurement deficiencies shared by compensation surveys include difficulties reflecting the changing nature of compensation, high nonresponse rates and problems in assessing change over time. Although benefits have accounted for an ever growing share of labor costs since World War II--27 percent of private employers' compensation costs in 1988--the surveys tend to measure only wages or salaries. The exclusion of benefits understates compensation increases over time, and may distort comparisons among different groups of workers. For example, lump sum payments (which are classified as benefits) boost earnings for those who receive them.[21]

Noncash benefits can be difficult to quantify and classify.[22] The employment cost index is the only nation-wide government survey which quantifies the cost to employers of benefits (the employee benefits survey measures only their incidence). The Census Bureau has attempted to measure the value of several major benefits to workers, but has not yet measured vacation and sick leave benefits, which account for a fourth of employers' benefit costs.[23]

High nonresponse rates and information processing constraints often undermine accuracy. Nonresponse rates for the annual March CPS income questions have risen more than fivefold during the past four decades:

1948	5.3%
1958	7.0
1968	11.2
1978	18.2
1982	26.6
1987	28.3

TABLE 3. THE SCOPE AND COVERAGE OF COMPENSATION SURVEYS VARY WIDELY

Survey	Sample Size	Time Period Covered	Compensation Covered	Workers Covered
Earnings				
CPS	55,800 households	hourly	regular hourly rate at principal job	only those paid on an hourly basis
		weekly	usual earnings (including overtime and tips) at principal job	all wage and salary employees
CES	330,000 establishments--over 44 million workers	hourly and weekly	wages except bonuses and tips	production or non-supervisory employees
UI data	90% of workers, 98% of nonagricultural wage and salary employees	weekly and annual	wages, bonuses, tips	workers covered by UI laws
Professional, administrative technical and clerical pay survey	5,200 service-producing, 3,000 goods-producing establishments	annual	annual salary	private sector employees comparable to federal employee occupations
Decennial census	19% of household	hourly and annual	earnings, bonuses, tips, etc.	all workers
Benefits				
Employee benefit survey	2,000 private and 1,000 state and local establishments	annual	incidence and characteristics, but not dollar cost, of various benefits	employees in medium and large firms and state and local governments
Earnings and Benefits				
CPS	55,800 households	annual	all earned and unearned income plus some benefits	all workers
Survey of income and program participation	11,600 households	hourly, monthly, and annual	all earned and unearned income plus some benefits	all workers
Employment cost index	4,300 establishments	hourly	cost of total compensation to employer	all nonfederal employees
Industry wage surveys	40 industries: sample size varies by industry	hourly and weekly	wages (excluding overtime) and some benefit incidence	nonsupervisory employees in selected occupations
Area wage surveys	90 metropolitan areas: sample size varies	hourly and weekly	wages, overtime and some benefit incidence	selected occupations in selected industries

SOURCES: Bureau of Labor Statistics, U.S. Department of Labor and Census Bureau, U.S. Department of Commerce.

Starting with 1962, the Census Bureau matched data from similar respondents to estimate nonrespondents' income. This procedure has increased the usable size of the sample, but at the price of uncertain accuracy, especially for higher earners who are most reticent about divulging their incomes.[24] SIPP nonresponse rates have averaged around 10 percent for wages, and about 15 percent for self-employment earnings. During the past few years, some 10 to 13 percent of CPS respondents provided no information on weekly earnings, and 13 to 15 percent provided no information on hourly earnings. Nonresponse rates for weekly and hourly earnings have fluctuated widely since the 1970s, in contrast to the consistent increases found in the annual supplement.[25]

The concept of "usual" weekly earnings is inherently ambiguous and therefore difficult for respondents to report accurately. According to one study, individuals underestimated their usual weekly earnings (compared to an actual mean of the three previous months) by six percent, although the same individuals accurately reported earnings for the previous pay period or year.[26] Finally, CPS enumerators record only weekly earnings below $1,000. This policy precludes information on high earners and the calculation of mean earnings. The number of wage and salary workers above the cut-off point has tripled since 1983, and is approaching 5 million.

Comparisons between employer and employee reports of average earnings indicate that the former are about five percent higher.[27] The discrepancies were larger for low earners, and overall averages tend to obscure misleading results when examining population subgroups.[28]

BUTCHER, BAKER, CANDLESTICK MAKER

Employment by occupation and industry is difficult to define, but such classifications represent the only national source of information concerning the types of establishments that employ workers and what individuals do on the job. Industrial categorization has enabled analysts to track the economy's transition from farming to manufacturing and services. Understanding changing occupational structure and job mobility is critical for educational planning and assessing the ability of the workforce to respond to change. The goals of education and training in a society where individuals hold one job for life would differ greatly from those in a society where workers change careers every few years. Occupational data may also be used to determine whether employers comply with equal employment opportunity laws, and in gauging the number of immigrants accepted into the United States to fill occupational shortages.

Problems in obtaining reliable industrial and occupational data are almost as old as the republic. James Madison proposed that the initial 1790 census classify workers by the industries in which they were employed (agriculture, commerce or manufacturing), but the Senate rejected the proposal without recording the basis for disapproval. When the issue was debated in the House, one member argued, as some do today, that the collection of the data would involve added costs while offering little benefit "beside gratifying an idle curiosity."[29] The decennial census first collected data on employment by industry in 1820, and on occupational status in 1850. From 1850-1900, the Census Bureau used the same question to identify

industry and occupation. The quality of industrial and occupational statistics improved in the first decade of this century, when the decennial census distinguished the two concepts and BLS began collecting employment data by industry.

The federal government designed a single, government-wide standard industrial classification (SIC) system in 1938, which classifies establishments into over 1000 categories. Despite the system's ostensible uniformity, various data collection agencies often assign different codes to the same establishment.[30] The SIC has also failed to make adjustments for the increasingly diversified activities of establishments. For example, department store chains now include units which provide optometric, financial, photographic and travel services, but the SIC continues to classify all employees in these establishments as working in department stores. Conversely, many establishments now use subcontractors for services previously performed internally. Reported department store employment would drop significantly if all stores simultaneously contracted out their snack shops to a food service chain, and employment in the food service industry would rise.

In 1977 the federal government adopted a standard occupational classification (SOC) code, analogous to the SIC. The SOC did not replace the three classification schemes already in existence, but instead all three codes are intended to be compatible with the SOC (see Table 4). The decennial census occupational coding system, also used in the CPS, is the most widely-available system for labor force analyses. To provide more timely and detailed occupational information for planning and projections than that offered by the decennial census or CPS, BLS initiated in 1971 the triennial occupational employment statistics (OES) survey. The OES is a massive survey of about 700,000 establishments employing roughly 46 million nonagricultural workers.

Although progress has been made, the information derived from the occupational classifications remains incompatible. The Census Bureau will use the 1980 scheme with minor modifications to classify occupations in the 1990 census, but prior to 1980 each decennial occupational classification system differed greatly from the previous one. In 1983, BLS and Census introduced new classifications in the CPS and OES, but inevitably comparability difficulties remain. Employment totals for the most recent year available (1986) indicate some large discrepancies between CPS and OES for selected occupations which the BLS regards as comparably defined:[31]

	OES	CPS	OES/CPS Ratio (thousands)
Licensed Practical Nurses	631	417	151%
Physicians	491	489	100
Registered Nurses	1,406	1,488	94
Lawyers	527	618	85
Engineers	1,371	1,749	78
Social Workers	365	480	76
Accountants and Auditors	945	1,257	75

It is difficult to determine whether definitional inconsistencies or survey differences are the major source of these discrepancies, although household versus establishment-based surveys unquestionably produce different categorizations, perhaps because individuals tend to upgrade their occupations.[32] The occupational employment survey apparently provides a more reliable classification than the CPS because of its larger sample size and the fact that establishment categorizations of jobs are more likely to be consistent than the responses of individuals.

Inconsistent occupational coding within the CPS results in serious errors even when the occupational classification system remains unchanged. For example, matched data from the same household at intervals of one year in 1980 and 1981 indicated that two-thirds of employed secretaries changed occupations. However, a January 1981 CPS supplement found that over 92 percent of employed secretaries did not change jobs during the previous year. Misclassifications occur because individuals provide different answers even though their occupation is unchanged, different household members act as respondents in different months, or the same information is coded differently by Census clerks.[33]

The inherent ambiguity of an "occupation" and the rapidity of economic change will continue to limit the usefulness of occupational statistics. The National Occupational Information Coordinating Committee, mandated by Congress in 1976 to coordinate occupational data, has attempted to facilitate the use of occupational data from various labor force and educational sources, but major obstacles remain.[34] Use of a single coding system, perhaps a modified standard occupational classification, would eliminate some of the inconsistency.

More accurate data might provide better insights into occupational mobility, but their value to educational planners and designers of job training programs is limited. National data have limited relevance to local planners because most jobseekers do not search for employment in national markets. Mandatory listings of job vacancies, a practice adopted by some nations, would provide better occupational information at the local level, but American employers have successfully opposed such legislation. In 1972 President Nixon ordered firms doing business with the federal government to report job vacancies paying an annual wage below $18,000 (about $53,000 in 1989 dollars) but the order was largely ignored.

TABLE 4. THE FEDERAL GOVERNMENT-SUPPORTED OCCUPATIONAL CLASSIFICATIONS EXIST TO MEET VARIOUS NEEDS

Occupational Classification System	Year Introduced	Current Number of Occupations	Principal Uses
Standard occupational classification	1977	665	Serves as the standard for other classification systems
Decennial census code	1870	503	Used for a wide variety of analyses System also used for CPS occupational classifications
Occupational employment statistics	1971	over 700	Projections and planning for educational and training programs
Dictionary of occupational titles	1939	12,900	U.S. employment service uses DOT to match jobseekers with job openings

SOURCES: Bureau of Labor Statistics, U.S. Department of Labor and Census Bureau, U.S. Department of Commerce.

WORK AND EDUCATION

Public concern about the quality of the American workforce and educational system has risen dramatically in recent years. Most workforce preparedness statistics are crude measures which either assess literacy or use years of schooling as a proxy for ability. The 1840 decennial census first attempted to measure literacy by inquiring whether respondents could read or write, and a full century later the Census Bureau added questions about years of schooling.

More recent surveys have attempted to measure educational achievement in addition to attainment.[35] The National Assessment of Educational Progress, which tests 9-, 13- and 17-year-olds on a variety of subjects, is the only national skills test conducted on a regular basis. The two major surveys that assess the relationship between educational skills and labor market experience are the national longitudinal survey of youth labor market behavior and the federal Education Department's high school and beyond survey.[36] Because both are longitudinal surveys, it will be possible to examine the relationship between basic skills, educational attainment and work experience as the study's young adults mature.

Analysts use CPS educational attainment data as a proxy for competency or skills (as do employers in making hiring decisions). The correlation between the two concepts is imprecise, and the CPS methodology in ascertaining educational attainment exacerbates the problem. Respondents are asked how many grades they have completed, not whether they have attained a diploma or degree. For example, individuals completing 12 or 16 school years are assumed to possess a high school diploma or a college degree, respectively. A 1984 SIPP supplement found the following discrepancies between grade completion and educational attainment:[37]

Proportion of:	
Individuals with a high school diploma but less than 12 years schooling	8 percent
Individuals with 12 years schooling but no diploma	2 percent
Individuals with a college degree but less than 4 years of college	2 percent
Individuals with at least 4 years of college but no degree	10 percent

Comparisons using the decennial census or test censuses indicate that the discrepancies may be wider than this, and have grown over time.[38] Because the concept of a year of schooling is based on full-time attendance, the growing number of part-time postsecondary students suggests that CPS procedures should be reevaluated.

Information on educational achievement and the relationship between schooling and work has improved during the past decade. However, tight funding, conceptual problems, state and local bureaucratic resistance to federal data collection efforts, and the poor quality of educational statistics will continue to limit progress.[39] Reliable data on job competency or the training provided at work are scarce.[40] Two inexpensive steps could be taken immediately. The Census Bureau might collect data on degree attainment, differentiating attainment by graduation and equivalency degree. Second, federal government and private analysts could gain greater insight into the educational achievement/work experience connection by more thoroughly mining existing longitudinal surveys that assess educational ability.

PRODUCTIVITY

Productivity is defined as the quantity of goods and services (output) produced per unit of input--labor, capital, natural resources, or some combination of these factors. Productivity is an important indicator of economic efficiency and a determinant of real earnings over the long run. In the absence of other acceptable data, BLS uses the market value of goods and services produced as a proxy for output. Therefore, investment in resources to control pollution (which benefits the economy in the long run, not to mention the quality of life) would reduce productivity on paper because clean air and water are assigned no market values.

BLS first attempted to measure productivity early in this century, and until 1983, it published only output per worker hour indices, which only indirectly reflect the efficiency of labor. For the same reasons, a mile per gallon ratio measures more than the efficiency of a specific fuel. In 1983, BLS began publishing data (covering the period from 1948 forward) on multifactor productivity, which assesses both capital and labor inputs for the private business economy. For the manufacturing sector alone, BLS multifactor productivity measures also include the additional inputs of energy, materials and services.[41]

Input data are hampered by difficulties in obtaining reliable data on working hours (and other inputs for multifactor productivity). Measuring output is especially troublesome in industries with no clearly quantifiable product. The most obvious difficulties involve government and nonprofit institutions, whose output is not sold in the marketplace. Is the productivity of a teacher with 40 students in the classroom double that of an instructor with 20? Determining the output of many other service-producing industries is also problematic because determining a quantifiable "unit of service" involves heroic judgments. The Bureau of Labor Statistics, therefore, provides estimates for only 38 industries outside the goods-producing sector.

Another challenge faced by the designers of productivity indices is how to incorporate quality changes into output data.[42] Even within the same industry, outputs are not necessarily identical, and, as noted earlier, analysts substitute dollar value for physical volume to estimate "real" output. When a product or production technology rapidly improves, this technique may fail to capture real productivity gains.

A National Academy of Sciences commission, chaired by Albert Rees of the Sloan Foundation, concluded in 1979 that sluggish productivity growth was real and not due to measurement difficulties.[43] A 1988 Brookings Institution assessment of productivity reached a similar conclusion. The authors raised the question, "Can measurement error 'explain' all, some, or none of the post-1973 U.S. productivity growth slowdown?" The answer, "some, but not much."[44]

However, the continued growth of the service sector casts doubts about how accurately current productivity statistics measure overall economic efficiency. International comparisons, which have assumed increasing importance due to expanding global markets, are restricted to the shrinking manufacturing sector because of measurement difficulties. A recent American Economic Association committee's review of the quality of economic statistics concluded that reported productivity trends for certain industries were "so puzzling as not to be fully believable." For example, productivity in financial services has not grown since World War II despite computerization, automatic teller machines, and electronic transfers.[45]

PEERING INTO THE CRYSTAL BALL

The recorded propensity of people to fathom the future predates the oracle at Delphi. Reliable predictions of the size and character of the labor force are of obvious importance for government and private sector planning. Projections receive an inordinate amount of public attention although they may be closer to seance than science, and too frequently turn out to be extremely inaccurate. BLS and the Census Bureau take pains to describe the limitations of projections and present different projections based on alternative assumptions, but the media often report projections as facts.

Workforce projections center on labor force and employment levels, the distribution of employment by occupation and industry, and the educational background of the labor force. The conceptual approach to projections is fairly simple, although the models may be complex. After examining past trends, the analyst develops a model and then applies assumptions about the future to generate projections, usually assuming that the past is prologue to the future.[46] However, unforeseen developments abound. Underestimation of the influx of immigrants and women into the labor force has foiled recent BLS workforce projections, and more sophisticated models have done little to improve accuracy. The 15-year advance employment projections were closer to the mark for 1975 and 1980 than for 1985, and the 1980 occupational projections were less accurate than those for 1975. The 1970 projection underestimated by 11 million people the actual 1985 labor force.[47]

Predicting the distribution of occupational and industrial employment is an even more hazardous endeavor. BLS uses the occupational employment survey and its economic model to make these projections. The principal problems are that many jobs do not have fixed entrance requirements, and we have limited knowledge of occupational mobility patterns. Changes in occupational and industrial classification systems exacerbate the problem of comparing projections with results.

The quality of the 1985 forecast could not be assessed due to new occupational classifications installed in 1983.

Ironically, public and private policymakers, who continue to demand labor force projections, rarely use the data to plan or implement programs. Given the inaccuracy of most forecasts, this situation may be fortuitous. Even when projections may be on the mark, belated action may make them immaterial.

IMPACT OF TECHNOLOGY

New technology has enriched labor force statistics and enabled analysts to gain insights into labor market operations unattainable before computers replaced the quill. Computer advances have permitted analysts to collect more information and process it faster with drastically reduced costs. For example, a computer that now costs less than $10,000 has a capability comparable to the mainframe systems introduced in the mid 1970s costing several million dollars. BLS analysts process a larger CES sample in a few hours, compared with two weeks three decades ago.[48] As an additional bonus, the federal government can now analyze much of the information that previously was collected but unused. Computers have greatly enhanced every facet of statistical surveys: the compilation of household and establishment lists, sample selection, editing and quality control, imputation to compensate for missing survey data, tabulation, analysis, and publication. The matching of data for the same person--either from different interviews within a single survey, or among surveys or administrative records--would be unthinkable without computers. Finally, advances in personal computers, combined with drastic price reductions, now enable researchers outside the government to analyze the data, potentially enriching the knowledge obtained from labor force statistics. Currently, the burden upon respondents and the cost of collecting information exercises more of a constraint than does data processing, analysis and dissemination.

Surprisingly, one of the most important innovations in survey research during the last few decades has been a device invented over a century ago: the telephone. Making use of its widespread availability, the Census Bureau introduced telephone interviewing into the CPS three decades ago, and currently conducts about two-thirds of the interviews by phone. The proportion would be higher but for a CPS policy requiring personal visits at the first and fifth interviews to maximize respondent cooperation, and the need to include the seven percent of households without phones. Telephone interviewing has reduced survey costs and thereby allowed government statistical agencies to avoid further retrenchment due to budget cuts. However, telephones have not been an unmixed blessing. Respondents tend to be more wary of providing information over the phone, especially on sensitive topics, and tend to become more impatient with lengthier interviews.[49] The recent deluge of private sector surveys--and sales pitches masquerading as surveys--may well exacerbate the difficulties of data collection via phone.

Currently BLS and the Census Bureau are testing the use of computer-assisted telephone and personal interviewing. Rather than using pencil and paper,

enumerators will work from computer terminals. These innovations will not increase the proportion of phone interviews, but will instead eventually result in more phone interviews originating from centralized facilities rather than from the field. Computer-assisted interviewing may potentially reduce processing time, mistakes and costs. Centralization will also increase the ability to monitor survey operations.[50]

BLS is implementing computerized data collection in its establishment surveys, and the Census Bureau is now interviewing several thousand CPS households with computer-assisted telephone techniques. Preliminary results for the CPS have shown similar results and costs compared with current methods, but the sample is still too small and the project too new to draw firm conclusions. One concern is greater undercoverage of minority males.[51] The introduction of computer-assisted personal interviewing, using a portable computer, is still in the early stages. The Census Bureau is attempting to contract for a computer which is both powerful and light enough to conduct its surveys. The U.S. National Center for Health Statistics has tested a portable computer with encouraging results, but the Census Bureau does not expect to incorporate computer-assisted personal interviewing into CPS before 1994.[52]

Results for the establishment survey have been unequivocally promising. Response rates of the 5,000 participating establishments during two years show marked, identical improvements for either computer-assisted telephone interviewing or touch-tone telephone data entry compared to the current mail system:

Collection Wave	Mail	Telephone
Initial report	50%	85%
First revision (3 weeks later)	75	98
Second revision (3 weeks later)	87	100

Survey attrition was also over a third less. These results are even more impressive because a sample of late reporters was targeted for testing the new methods. Costs, compared to the current system, were 30 percent less for touch-tone entry, and 20 percent more for computer-assisted telephone interviewing.[53]

Efforts by agencies and private researchers suggest that survey quality could be greatly improved by targeting key difficulties, coordinating research, and modestly increasing funding. However, a variety of important questions about the labor force cannot be answered without modifying existing surveys and initiating new ones. Implementation of the necessary improvements requires enhanced funding and sustained leadership.

SURVEY QUALITY

Labor force surveys face a variety of obstacles--some inevitable--to achieving accuracy. Analysts distinguish between sampling and nonsampling survey errors. Statistical probability techniques enable analysts to limit the margin of sampling error if the sample size is adequate and random. Nonsampling errors--a product of low response rates, poorly-worded questions, interviewer or respondent error, and the impact of survey technology--introduce more serious inaccuracies into social surveys. The following discussion focuses on CPS because it has been more thoroughly scrutinized than other surveys--which may, in fact, make it of better quality.

Undercoverage

In addition to decennial census undercounts, CPS misses an estimated 7 percent of the population. Undercoverage of black men has been rising steadily for a decade, to as much as a fourth of black males over age 14; a third of Hispanic males are missed.[54] Even enumerated respondents are selective in responding to some questions, especially those dealing with income. Response rates for CPS income questions have dropped steadily, partly because of public distrust of government and partly because the Census Bureau has expanded the number of income questions in the survey.[55] Respondents may choose not to disclose source of income and fail to report receipt of welfare, educational, food and housing benefits provided by government.

Undercoverage is clearly related to the underground economy, but its overall impact on the results is uncertain. For example, the widespread assumption that unemployment rates are inflated because persons engaged in illicit activities are not likely to reveal their "profession" to enumerators may be erroneous, because the majority of prison inmates report that they held legitimate jobs in addition to engaging in illegal activities.[56] On the other hand, it is undoubtedly true that "earnings" from the highly lucrative drug trade are unreported in government surveys. According to one estimate, on average inner city males derive more than a quarter of their income from illegal activities.[57]

Improving response rates may prove difficult because a large part of undercoverage appears to be deliberate. Results from the Los Angeles test run for the 1990 census indicated that two-thirds of missed persons resided in households counted in the survey.[58] Although the Census Bureau has maintained an impeccable

record of confidentiality, surveys have indicated that half of respondents believe that outsiders can obtain access to the information.[59]

Survey Design Problems

Poorly-worded questions, and even asking the same questions at repeated intervals, can produce skewed results. For example, the distinction between the concepts of "unemployment" and "out of the labor force" depends upon the enumerator's and respondent's interpretation of what constitutes "job search." Given the importance of semantics and perception in conducting surveys, government statistical agencies have made efforts in recent years to gain better insights into how respondents interpret questions.[60] BLS did not possess adequate funding to establish its cognitive research laboratory to test current and potential future CPS questions until 1988, and large-scale field tests of new questions have not taken place since the 1960s.

CPS illustrates the importance of precise wording. BLS tested a new question on discouraged workers in the early 1980s and unexpectedly found that the new question produced lower reported unemployment rates.[61] Similarly, the addition of a seemingly innocuous occupational question in the early 1970s resulted in considerable changes in job classifications. To the question, "What kind of work were you doing?" BLS added, "What were your most important activities or duties at this job?"[62] The additional probing improved the responses.

Responses to CPS questions indicate the effects produced by repeated interviews. BLS found that respondents interviewed only once reported a significantly higher unemployment rate than those interviewed four times. SIPP labor force data reflect similar difficulties.[63] Analysts are still pondering a satisfactory explanation for this phenomenon.

Interviewer Error

Changing economic and social conditions have make it increasingly difficult to hire and retain skilled enumerators. The mass entry of women into the workforce has greatly narrowed the hiring pool available to the Census Bureau, particularly in areas with low unemployment rates. Interviewing is a low-paying, part-time job with little career potential. Greater numbers of women at work also mean that fewer respondents are home during the day, and night-time interviewing is not an attractive task in cities. Consequently, almost half of Census Bureau interviewers leave within a year.[64] The Census Bureau conducts reinterviews with a sample of respondents to spot enumerators' mistakes and to weed out poor performers, but provides only minimal training to new employees.[65]

Respondent Error

Erroneous answers--due to faulty memory, lack of knowledge, or an unwillingness to be truthful--probably account for the lion's share of inaccurate results. Because

of errors due to memory lapses, the annual March CPS supplement (which relies upon recall of over a year) understates the incidence of unemployment by a fifth compared to the monthly CPS. Respondents remember the timing of unemployment spells even less accurately. Faulty recall, conceptually ambiguous labor force categories, and respondents' casual attitudes concerning precision cast doubts about the reliability of reported unemployment duration.[66] An individual who spent 10 months between jobs but only looked for work during the last 5 tends to equate joblessness with unemployment, although BLS would consider the person as unemployed only while searching for work.

Errors also occur because respondents don't know the answers to questions. CPS (but not SIPP or the national longitudinal surveys) relies on any responsible household member to provide information about the entire household. Analysts have reached differing conclusions about the error caused by proxy respondents, who supply information on about half the CPS sample. A BLS test indicated that proxy responses relating to earnings, hours, industrial and occupational categorization, and whether a jobless individual had looked for work are particularly flawed.[67] Information obtained about children from their parents and vice versa is probably most susceptible to inaccuracy. For example, the national longitudinal survey of youth (which directly questions young people) produces higher labor force activity estimates than CPS (which usually interviews parents):[68]

	16-21-year-olds NLS	(Spring 1979) CPS
Labor force participation rate	70.8%	59.9%
Employment/population ratio	57.3	51.5
Unemployment rate	19.1	14.1

One plausible explanation is that parents often have more rigorous perceptions of what constitutes work than do teenagers or young adults.

Current Employment Statistics respondent errors occur primarily when the survey definitions do not match those of the establishment's payroll. A recent BLS examination showed that discrepancies are common, but their precise impact is not yet known. In most cases, the establishments were willing to adjust their reports in line with BLS definitions.[69]

LABOR MARKET HARDSHIP

The nation's most publicized indicator of labor force hardship--unemployment--grew out of the experience of the Great Depression and requires augmentation. A half century ago, husbands were often the sole breadwinners and wives usually remained at home. Working did not guarantee plentitude, but protracted unemployment almost always ensured deprivation. The impact of job loss can be radically different

today. A person who is laid off may be eligible for unemployment insurance, and a spouse's earnings may be sufficient to tide the family over until the jobless partner finds work. If the family becomes impoverished, welfare programs may cushion the fall. But a comparison of unemployment rates over the past five decades would fail to reveal these developments.

In 1979 the National Commission on Employment and Unemployment Statistics urged BLS to develop new measures to assess the degree of economic hardship due to unemployment, involuntary part-time employment, and low earnings.[70] BLS produced such reports for six years before deciding to replace the series with a new one, scheduled to appear in late 1989. The new report will analyze the labor market problems of the poor, rather than examining the economic consequences of labor market difficulties.

BLS efforts to analyze and disseminate information on the economic impact of labor market related hardship have been half-hearted. The bureau has made virtually no effort to publicize the data, and didn't even issue a press release for the most recent report. Publication lagged behind the Census Bureau's initial report from the March CPS by a year, further dampening interest in the data. Having failed to publicize the belated findings, BLS officials argued that there was little interest in them. BLS did not publish any hardship data during 1988 and most of 1989.

Assessments of labor market-related hardship should measure at least three elements:

- *Inadequate individual earnings*. The number of individuals in the labor force who do not earn at least the equivalent of the minimum wage (adjusted for inflation or wage growth) for the number of hours they work, or are able to work but do not because of unemployment or the unavailability of full-time work.

- *Inadequate family income*. The number of labor force participants in families with total incomes below the poverty threshold.

- *Inadequate family earnings*. The number of labor force participants in families with total earnings below the poverty threshold.[71]

BLS measured the first two components but not the third, which would provide a critical indicator of how far short the economy falls in providing a minimal socially-acceptable family living standard derived from earnings.

BLS could also, with the consultation of outside experts, produce a composite indicator of labor-market hardship analogous to the poverty rate. The National Commission on Employment and Unemployment Statistics considered several composite indicators but rejected the approach on the grounds that a single number masked the different labor market difficulties leading to hardship. However, in time such an indicator might become as accepted as the government poverty line or unemployment count. Indeed, half a century ago a prime designer

of CPS wondered whether as complex a phenomenon as unemployment could be expressed in a single number, but respectability came with age.[72]

To date BLS has relied primarily upon data derived from CPS to produce hardship data, but SIPP data should be mined. Although not as timely, SIPP permits more thorough insights into labor market problems and their consequences. Unlike the annual March CPS, SIPP can trace over a 2.5 year period the economic impact of job loss or entrance into the labor force and the effects of changing family structure, including separations, divorces and the arrival of newborns. SIPP also collects information on assets, which represent a critically important resource for families that become temporarily impoverished.[73]

The Bureau of Labor Statistics and the Census Bureau have made continuing efforts to critically examine and improve their operations. Nonetheless, to enhance public confidence in the reported data, periodic outside reviews are necessary to suggest new directions and to examine changes proposed by the agencies. Congress initiated the latest commission on labor force statistics in 1976, and President Kennedy appointed the previous commission in 1961. The rapidly changing economy necessitates a thorough review of the nation's workforce statistics by a new Congressionally mandated commission. The monthly testimony by the BLS commissioner before the Joint Economic Committee focuses on the latest results, and rarely deals with technical issues.

Both the Census Bureau and BLS have outside advisory committees, but the BLS committees represent only the business and labor communities. Without detracting from the contribution these committees make, BLS would benefit by a third advisory committee comprised of outside labor force experts who would provide continuing advice to the agency and monitor its implementation of periodic commission recommendations. If we are to practice the precept of the Good Book that a "laborer is worthy of his hire," the advice should not come free and Congress should be willing to provide a modest budget for this committee, as it does for Census Bureau advisory committees.

IMPROVEMENTS INVOLVING MINOR COSTS

Undercoverage

The undercoverage of minorities in the decennial census and the CPS may underestimate the economic hardship minorities experience in the labor market. Technical adjustments for undercounting exist, but experts are divided regarding their feasibility and the controversy has entered the political arena. Adjustments may also affect the distribution of representatives among the states. More research is necessary to resolve the issue on its merits.

Labor Force Related Economic Hardship

Rigorous analysis of currently available information could better illuminate the connection between labor market participation and economic hardship. The bureau should publish CPS hardship data in a much more timely fashion, explore the feasibility of publishing a composite index of labor market-related economic hardship, and analyze the relationship between family earnings and poverty. BLS should also issue separate reports that thoroughly mine SIPP for its insights into hardship that CPS cannot provide.

Hours Worked

Data on working hours are inadequate to pinpoint whether low earnings are due to insufficient wages or working hours. Often respondents are asked only how much they "usually" work, and this ambiguity can be compounded by other questions on "usual" earnings. BLS is now considering the use of more precise questions on working hours in the CPS, and such questions should also be incorporated into SIPP.

Discouraged Workers

The last national commission recommended that BLS revise the definition of discouraged workers (those who don't seek work because they believe jobs are available) to exclude those who haven't sought work within six months.

Volunteers

Because of the similarities between voluntary and paid work as well as movements between the two categories--and to gain better insights into potential total labor force capacity--more frequent inquiries about volunteer work are in order. BLS made no such assessment between 1974 and 1989.

Question Wording

CPS is not immune to inaccuracies inherent in any repetitive sample. Some of the resulting doubtful information could be eliminated by relating questions one month to the answers provided the previous month. For example, rather than asking respondents how long they have been looking for work, they should be asked how long they have looked for work since the last interview.

Publications

The BLS publications system requires rethinking and probably a major overhaul. The Bureau publishes compensation information in a disjointed fashion. The periodical *Current Wage Developments* includes some series, *Employment and Earnings* has others, and information on annual earnings is not published by BLS at all but instead appears in Census Bureau publications.

BUT STATISTICS COST MONEY

Modest investments in current surveys and in administrative records could greatly enhance our understanding of labor market operations, particularly individual employment experience over time.

Doubling CPS Sample Size

A monthly expansion of CPS sample size to 120,000 households would significantly increase the reliability of information about smaller states, major labor markets and subgroups, including youth, minorities and union members. To minimize its peak workload, BLS plans to expand the CPS in a way that would enhance only state and local data, limiting the value of a larger sample size. Clearly, some tradeoffs are involved, but the tentative decision of BLS needs scrutiny.

Income Data

Nonresponse rates relating to earnings and income threaten the integrity of reported CPS results. Seeking means to increase response rates for income information deserves priority consideration from the Census Bureau and BLS. Some surveys compensate participants, a solution worthy of testing but one which would require additional funding.

Longitudinal CPS Data

By reinterviewing households eight times during 16 months, CPS represents a potential source of longitudinal information over the period. Funding is needed to investigate how reinterview bias may be minimized or adjusted, and the costs of reducing proxy responses.

Utilizing Administrative Data

With appropriate consideration of confidentiality, matching CPS and SIPP data with administrative records would provide added knowledge about the long-term impact of education, race, sex, disability and family status on employment and earnings. Social security and unemployment insurance data can potentially provide significant information on the long- and short-term labor market experiences of individuals. Computer advances have generated new opportunities, but statutory restrictions have frustrated the use of social security data. Since 1978 the Social Security Administration has collected information on individuals' total annual earnings (prior to that SSA recorded earnings only up to the social security payroll tax limit). However, the 1976 Tax Reform Act proscribed the distribution of social security information to other agencies or the public even if identifying information is removed from the records.

Administrative records could shed light on a variety of important questions. SSA earnings records can be used to investigate lifetime earnings histories. Unemployment insurance data, collected on a quarterly rather than annual basis, have already been used in a few states to study short-term economic transitions and the impact of government education, training and welfare programs on employment and earnings. Most states discard individual unemployment insurance records after a year and a quarter, although longer earnings histories can be stored at negligible costs.[74]

In addition to federal funding, statutory and record-keeping changes would be necessary to fully utilize administrative records. The Social Security Administration and the Internal Revenue Service have experienced major difficulties in modernizing their computerized information processing systems, problems which also plague state unemployment insurance record systems.[75] Congress should permit SSA to make social security records available with adequate safeguards to preserve confidentiality. Until the 1970s, these records were available with no demonstrable disclosure of individual records. Accurate matching requires the presence of a social security number, collected for 95 percent of SIPP respondents, but only for 75 percent of March CPS income supplement respondents, and less than half of respondents for other months. However, Congress might guard more vigilantly against the improper dissemination of government-collected data. Before it was halted in mid-1989, the Social Security Administration had allowed major banks and credit bureaus to match social security numbers with the agency's files for a decade.[76]

BEYOND THE HORIZON

Meeting the policy challenges of the 1990s amid rapidly-changing economic and social conditions and increasing international competition will require renewed dedication to the quality of workforce statistics. The next commission on labor force statistics should provide guidance for the long-term goals of the system. Other than the introduction of SIPP, there have been few major developments in labor force statistics since the 1960s. Among the important questions that the next commission should address are meeting the need for better statistics to help understand the slowdown in productivity, the relationship between CPS and SIPP, the need for better longitudinal and international information, the interaction between the worker and the firm (including worker training), workforce quality, how to improve service sector data, and enhancing the collaboration among data collectors at all levels of government. Many of thee issues will be difficult to resolve and the quest for improving labor market data will require larger statistical budgets, but a prestigious congressionally mandated commission could sensitize policy makers to the data needs.

New Surveys

Continuing interest in the underclass and the preparedness of the workforce emphasizes the importance of information about the long-term behavior of individuals. Is the proportion of adults with little employment or earnings for long periods growing? How frequently do individuals change careers? How strong is the connection between educational specialization and subsequent occupation? Careful longitudinal studies can illuminate these areas but current samples, selected over two decades ago, have suffered considerable attrition or are restricted to narrow age cohorts. The next commission should assess the alternatives of enhancing the current surveys or beginning new ones. It should also consider the desirability of funding a longitudinal survey of establishments.

Comparative Data

The growth of international trade and U.S. trade deficits has heightened interest in comparative international labor force statistics. BLS, the International Labor Organization, the Organisation for Economic Co-operation and Development, and the Luxembourg Income Study have taken steps toward improving the comparability of international labor force statistics, but sustained leadership and commitment are imperative if adequate progress is to be achieved. Similarly, the International Association for the Evaluation of Educational Achievement and the U.S. National Assessment of Educational Progress represent valuable first efforts in measuring educational achievement, but efforts to measure specific job competency have barely begun and the task is daunting.

CPS-SIPP

The collection of similar data by CPS and SIPP has not escaped the attention of the Office of Management and Budget. The next commission should map the long-term content and dissemination of both surveys. The overlap has revived BLS/Census jurisdictional questions concerning where to draw the line between workforce-related and other data, and who should analyze and publish workforce data. BLS has used almost no data from SIPP, and underutilizes the annual March CPS supplement, leaving the field primarily to the Census Bureau. The Census Bureau, apparently, has been similarly reluctant to infringe upon BLS turf, disseminating little SIPP labor force data.

In transmitting its report to the President and Congress, the 1979 National Commission on Employment and Unemployment Statistics concluded, "The nation is served by a comprehensive labor force data system expertly prepared by a cadre of dedicated public servants. But if the statistics are to reflect changing economic conditions and meet policy needs, periodic revisions and improvements are necessary."[77] This holds true today as it did a decade ago. A new congressionally mandated commission could serve not only to focus public attention on past neglect, but to help BLS and the Census Bureau invigorate a system that would provide better insight about labor market operations and their impact upon individuals and families.

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